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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,158	05/24/2000	Tsuyoshi Kowaka	192210US0	4954

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OBLON SPIVAK MCCLELLAND MAIER & NEUSTADT PC
FOURTH FLOOR
1755 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

EXAMINER

WILSON, DONALD R

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 12/05/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/577,158

Applicant(s)

KOWAKA ET AL.

Examiner

D. R. Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 5-9 and 26-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☒ Claim(s) 10-25 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,5,6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Restriction Requirement

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- 29-32, 38-44, 46-51
33-37, 45
52
53-54
- I. Claims 1-4, drawn to a method of preparing polyvinyl alcohol (PVOH), classified in class 525, subclass 62.
 - II. Claims 5-9, drawn to a two stage method of preparing PVOH, classified in class 525, subclass 62.
 - III. Claim 26, drawn to a method of making a PVOH fiber, classified in class 525, subclass 56.
 - IV. Claim 27-28, drawn to PVOH, classified in class 264, subclass 176.1+..

2. Claims 10-25 are improperly multiply dependent from other claims of both Groups I and II. If the inventions of Groups I or II are chosen they will be grouped with the elected group until the claims are made proper. Upon amendment, Claims 10-25 may be subject to further restriction.

3. The inventions are distinct, each from the other because:

- a. Inventions of Groups I-II and Group IV are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as by multiple saponification treatments in dilute solutions of alcohol.
- b. Inventions of Group IV and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product as claimed can be used in a materially different process of using that product such as a process to make a film.

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c. The inventions of Groups I-III are distinct from one another as they comprise different steps.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and/or have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

Election of Species Requirement

5. This application contains claims directed to the following genera of patentably distinct species of the claimed invention:

- a. alcohol containing solvent
- b. saponification catalyst (Group I, and first stage Group II),
- c. second stage alcohol containing solvent (Group II), and
- d. second stage saponification catalyst (Group II).

6. As appropriate to the elected group of inventions, applicant is required under 35 U.S.C. § 121 to elect a **single ultimate** disclosed specie for each of the above genera for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Where specific species are not identified in the claims applicant should elect a specific specie from the specification. An alternative method of election is to identify an Example which collectively exemplifies the elected species. Currently, Claims 1-9 are generic to the above species.

7. Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

8. Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

9. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

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Conclusion to Restriction/Election Requirement

10. During a telephone conversation with Mr. William E. Beaumont on 11/28/01 a provisional election was made with traverse to prosecute the inventions of Group I, Claims 1-4 and 10-25, and the species of (a) a mixture of dimethyl sulfoxide and methanol as the alcohol containing solvent, and (b) sodium methoxide as the saponification catalyst. Affirmation of this election must be made by applicant in replying to this Office action. Claims 5-9 and 26-28 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Claims 10-25 as noted below are improperly multiply dependent claims and cannot be fully treated on the merits. If amended to be properly dependent, they may be subject to a further restriction requirement.

11. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Improper Multiple Dependent Claims

12. Claims 10-25 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only, and cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'807 or Sato,

each in view of Morrison or Yanai. *The RO English is* The Derwent and JPO English language abstracts have been used

as an interpretation of JP'807 along with translations of segments of the Examples. *having a n of at least 1.4 dl/g*

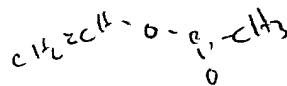
16. JP'807 discloses saponification of a polyvinyl ester such as polyvinyl acetate (PVAc) in a solvent among which dimethyl sulfoxide (DMSO) is specified, or in admixture with methanol, in the presence of a saponification catalyst. *(pages 6-7)* The catalysts which can be used include alcoholates of alkali metals, of which sodium methoxide would have been an obvious example. *p. 8 (2nd)* Example 1 exemplifies a saponification of 20 pbw of PVAc in a mixture of 180 pbw of DMSO and 37 pbw of methanol (9.2 wt.% PVAc). *the water content of MeOH to 0.1%* Example 2 exemplifies saponification of a 180 pbw of a 22 wt.% solution of PVAc in methanol admixed with 178 pbw of dimethylformamide (11.1 wt.% PVAc). JP'807 is deficient in not disclosing that the saponification reaction is carried out while distilling off the carboxylic acid ester reaction product.

17. Sato discloses processes for producing polyvinyl alcohols (PVOHs) containing various functional groups, which includes a hydrolysis step of the precursor polyvinyl ester. It is specifically disclosed that "[a]ny ordinary hydrolysis of polyvinyl esters that uses a basic or acid catalyst may apply to the present invention." An example of said hydrolysis includes using sodium methylate (methoxide) as the basic catalyst, an alcoholic solvent such as methanol, and in order to improve solubility of the vinyl ester, the presence of an appropriate solvent among which DMSO is specifically named (col. 5, lines 19-37). Vinyl acetate polymers are preferred as is evidenced by the examples. Thus, Sato discloses that the hydrolysis of PVAc in solvents such as a mixture of DMSO and methanol with sodium methylate catalyst is ordinary, but is deficient in not disclosing that the saponification reaction is carried out while distilling off the carboxylic acid ester reaction product.

18. It is a well established that transesterification reactions are equilibrium reactions, and that in order "--- to shift the equilibrium to the right, it is necessary to use a large excess of the alcohol whose

$$\frac{37}{32} : \frac{20}{86}$$

$$u = 0.125$$



$$\frac{48}{32} = \frac{3}{2}$$

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ester we wish to make, or else to remove one of the products from the reaction mixture" (Morrison pp 682-683). Morrison also teaches in the same place that the second approach is the better one when feasible, since in this way the reaction can be driven to completion. Yanai makes a similar disclosure in a process of saponifying ethylene-vinyl acetate copolymers in mixtures of DMSO and methanol. It is taught that "--- for the purpose of increasing the saponification degree to shift the saponification equilibrium to the formed product side", and that "[f]or this reason it is desired to efficiently distill off the ester used, e.g., methyl acetate" (col. 10, lines 11-32). It would have been obvious to one of ordinary skill in the art in the saponification process taught by JP'807 or Sato, to distill off the methyl acetate formed, such as is taught by either Morrison or Yanai, in order to efficiently increase the degree of saponification. It would also have been obvious to commence distillation after an equilibrium is approached, i.e., after the methyl acetate had formed. Degrees of saponification in the primary saponification reaction such as are claimed would be expected to be below said equilibrium value.

19. Although JP'807 doesn't appear to teach reactions wherein the concentration of the polyvinyl alcohol polymer is 10 wt.% or more, some degree of latitude in what has been exemplified. Further, it would have been obvious to one of ordinary skill in the art to minimize the amount of solvent used in order to decrease the costs associated with recovering solvents. Sato exemplifies hydrolysis reactions in the examples wherein the concentration of the functionalized vinyl acetate polymer is above 10 wt.% PVOH. As the hydrolysis reaction has been equated to the ordinary hydrolysis of PVAc, it would have been obvious to one of ordinary skill in the art that such concentration are known to be used in the hydrolysis reactions disclosed for PVAc.

20. ***Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai in view of Morrison and Yanai, optionally in view of Examiner's Notice.***

21. Imai discloses an improved process for producing PVOH from PVAc by reaction in an organic sulfoxide solvent (col. 1, lines 60-68). The reactions disclosed include base catalyzed alcoholysis by methanol in a dimethyl sulfoxide solution of polyvinyl acetate (col. 3, lines 49-69, and Examples 3-5). However, Imai uses a large excess of solvent and is deficient in not disclosing that the saponification reaction is carried out while distilling off the carboxylic acid ester reaction product. The teachings of

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Morrison and Yanai are discussed above. It would have been obvious to one of ordinary skill in the art in the saponification process taught by Imai, to use a higher concentration of PVAc in the alcoholysis reaction and to distill off the methyl acetate formed, such as is taught by either Morrison or Yanai, in order to efficiently increase the degree of saponification, and to avoid the high cost of handling large quantities of solvent. It would also have been obvious to commence distillation after an equilibrium is approached, i.e., after the methyl acetate had formed. Degrees of saponification in the primary saponification reaction such as are claimed would be expected to below said equilibrium value. Imai is deficient in not disclosing the elected specie of sodium methoxide as the basic catalyst. However, it would be inherent that at least some minimal quantity of sodium methoxide would be present in equilibrium with the sodium hydroxide catalyst used. Alternatively, the Examiner takes Notice that the use of sodium methoxide as the basic catalyst in the alcoholysis of PVAc with methanol is well known and would have been obvious to use with the expectation of equivalent results.

Art of Interest/Technological Background

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kamachi discloses the preparation of non-elected species of the invention in DMSO/methanol solvent and may be used as a basis of future obviousness rejections.

Future Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. R. Wilson whose telephone number is 703-308-2398.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 703-308-2450. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-5408 for regular communications and 703-305-3599 for After Final communications. The unofficial direct fax phone number to the Examiner's desk is 703-872-9029.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-2351.

D. R. Wilson
Primary Examiner
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